



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,892	07/28/2003	Masayuki Shinohara	SUG-168-USAP	3807
28892	7590	01/23/2006	EXAMINER	
SNIDER & ASSOCIATES P. O. BOX 27613 WASHINGTON, DC 20038-7613			MALDONADO, JULIO J	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 01/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

1. The rejection as set forth in Office Action mailed in 07/12/2005 is withdrawn in view of Applicants amendments filed in 11/10/2005.
2. The cancellation of claims 1-3, 33, 35, 37 and 39 is acknowledged.
3. The allowance of claim 32 is withdrawn in view of the newly found reference, Ishikawa et al. to U.S. 5,488,233.
4. Claims 32, 34, 36, and 38 are pending in the Application.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 32 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 32 recites, "...the current spreading layer, on the light emitting layer portion, is formed as an n-type semiconductor layer by a hydride vapor-phase epitaxy process which is different from the metal organic vapor-phase epitaxy process...the current spreading layer has an MO layer portion formed by a metal organic vapor-phase epitaxy process in a portion in contact with the light emitting layer portion, and has an HVPE portion formed by a hydride vapor-phase epitaxy process in a residual portion...". This is found to be indefinite because claim 33 recites part of said "current spreading layer" which was previously claimed to be formed by a hydride vapor-phase epitaxy process, has a part (i.e., MO layer portion) that is formed by

Art Unit: 2823

another deposition method, which was specified to be different from the hydride vapor-phase epitaxy process. Appropriate correction is required.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa et al. (U.S. 5,488,233) in view of the prior art and Solomon et al. (U.S. 6,569,765 B1).

In reference to claim 32, Ishikawa et al. (Fig.12) teach a light emitting structure including an p-type semiconductor light emitting layer portion (162, 163, 164, 165, 166, 167, 168, 169, 170) made of III-V elements, and a n-type semiconductor current spreading layer portion (171, 172, 173), wherein a portion of the light emitting layer portion (162, 163, 164, 165, 166, 167) is formed by a metal organic chemical vapor deposition process, and wherein the current spreading layer portion (171, 172, 173) is formed by a metal beam epitaxy process which is different than said metal organic chemical vapor deposition process, wherein the current spreading layer portion (171, 172, 173) has a p-type blocking layer (171) in contact with the light emitting layer portion (162, 163, 164, 165, 166, 167, 168, 169, 170), wherein the current spreading layer portion (171, 172, 173) has an n-type high concentration doped layer (173) formed on the electrode forming side of the current spreading layer (171, 172, 173) having a

Art Unit: 2823

carrier concentration of n-type dopants higher than that of a residual portion (172, 173) of the current spreading layer (171, 172, 173), and wherein the layers formed by metal organic chemical vapor deposition are formed in a first reactor and wherein the layers formed by metal beam epitaxy are formed in a second reactor (column 13, line 13 – column 14, line 14).

Ishikawa et al. fail to teach wherein the current spreading layer is made of III-V elements, and wherein the high concentration doped layer has a dopant selected from the group consisting of Si, S, Se and Te. However, the prior art teaches a light emitting device including a light emitting layer portion; a current spreading layer portion formed on the light emitting layer portion; and an electrode between said light emitting layer portion and said current spreading layer portion, wherein the current spreading layer portion is formed by an N-type semiconductor layer, wherein said layers are made of group III-V semiconductors and wherein said light emitting layer portion and said current spreading layer portion are formed by metal organic vapor phase epitaxy and wherein the n-type dopants are selected from the group consisting of Si, S, Se and Te (Instant page 1, [0002] – page 5, [0008]).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Ishikawa et al. and the prior art to enable the current spreading layer of Ishikawa et al. to be formed of the materials disclosed in the prior art because one of ordinary skill in the art at the time the invention was made would have been motivated to look to alternative suitable materials for the disclosed current spreading layer of

Art Unit: 2823

Ishikawa et al. and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

Still, the combined teachings of the Ishikawa et al. and the prior art fail to teach a light emitting layer portion formed by metal organic vapor phase epitaxy process and a current spreading layer portion formed by a hydride vapor phase epitaxy process different from the metal organic vapor phase epitaxy process. However, Solomon et al. teach group III-V semiconductor heterostructures formed in a single chamber apparatus including a first layer formed by metal organic chemical vapor deposition and a second layer formed by hydride vapor phase epitaxy, which is different from the metal organic chemical vapor deposition (column 2, line 31 – column 3, line 37). Furthermore, Boutros et al. to U.S. 2005/0110041 A1 teach wherein metal organic vapor phase epitaxy processes are often known as metal organic chemical vapor deposition processes (Boutros et al., [0005]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Ishikawa et al., the prior art and Solomon et al. to enable the structure of Ishikawa et al. and the prior art to be formed in the chamber according to the teachings of Solomon et al. for the further advantage avoiding potential of contamination of the structures produced when switching from one reactor to another (column 3, lines 46 – 50).

The combined teachings of Ishikawa et al., the prior art and Solomon et al. teach wherein the concentration of dopants in the high concentration doped layer is about $1 \times 10^{19}/\text{cm}^3$ and wherein the concentration of dopants in the residual layer is about $1 \times 10^{18}/\text{cm}^3$ (Ishikawa et al., column 13, lines 29 – 55). Still, the combined teachings of

Art Unit: 2823

Ishikawa et al., the prior art and Solomon et al. fail to teach wherein the concentration of dopants in the high concentration doped layer is between $1 \times 10^{18}/\text{cm}^3$ to $1 \times 10^{19}/\text{cm}^3$ and wherein the concentration of dopants in the residual layer is between $1 \times 10^{17}/\text{cm}^3$ to $1 \times 10^{18}/\text{cm}^3$. However, in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. MPEP 2144.05. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the dopant concentration ranges disclosed in the combined teachings of Ishikawa et al., the prior art and Solomon et al. to arrive at the claimed invention.

Allowable Subject Matter

9. Claims 36, and 38 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Response to Arguments

10. Applicant's arguments with respect to claims 32, 34, 36, and 38 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicants are encouraged, where appropriate, to check Patent Application Information Retrieval (PAIR) (<http://portal.uspto.gov/external/portal/pair>) which provides applicants direct secure access to their own patent application status information, as well as to general patent information publicly available.

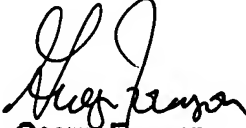
Art Unit: 2823

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571) 272-1907. The fax number for this group is 571-273-8300. Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.

Julio J. Maldonado
Patent Examiner
Art Unit 2823

Julio J. Maldonado
January 20, 2006


George Fourson
Primary Examiner